confirmed by the analogous connection of *Rœstelia cancellata*, the pear blight, with the gelatinous parasite of *Juniperus sabina*, it is well to attend to the following facts :—Professor Henslow in an article on the diseases of wheat, in the Journal of the Royal Agricultural Society, proved distinctly that what is commonly called rust is merely a condition of the common mildew, and this at a time when comparatively little was known about these parasites, and when many were inclined to accept the views of Unger that they were mere abnormal developments of tissue or spontaneous growths. The observations of Tulasne and others confirmed to a certain extent Professor Henslow's view, but threw further light upon the matter by showing that many so-called *Uredos* were merely a subsidiary form of so many species of *Puccinia*. Meanwhile, though *Uredo rubigo vera* was the subsidiary form of *Puccinia graminis*, it was recognised that *Uredo linearis* is nothing more than the early stage of the *Puccinia*. Though there is some resemblance between the Uredinoid form of the *Puccinia* and the rust of the berberry, there is none between the perfect condition of the parasite. Our readers will have noticed that at the meeting of the French Academy on August 1st, M. Roze contributed some further illustrations of this interesting subject.

The great difficulty has always been that mildew is most prevalent in countries where not a berberry bush is to be found ; and the same remark applies to the pear rust, which abounds where not a single plant of savine is to be seen, the parasite of the savine being comparatively of rare occurrence. I think, always assuming the fact of the connection between the two parasites, that it may be easily accounted for. It may be true that the berberry plant produces mildew ; but how is this? not probably from the spores of the present year, but from those which fell to the ground the previous season. There is no doubt that these parasites penetrate into the tissues of the young germinating plants, by means not of the original spores, but of minute secondary spores which are produced on them, a circumstance which is fully proved in the case of bunt. This, then, will account for the cereal being mildewed in the neighbourhood of the berberry. But another consideration is necessary to explain the prevalence of mildew where the berberry does not exist, or where it is confined to gardens. The subsidiary spores have no doubt, equally with the *Puccinia* itself, the property of reproducing the mildew, and there are always enough of these blown about, either from previous crops or from the neighbouring grasses, especially in the fens, where every ditch is filled with reeds affected more or less with mildew ; and thus the parasite may be propagated season after season without the Æcidioid form intervening, a circumstance which is not without analogy in other branches of the vegetable kingdom. I may be allowed, perhaps, to recall attention to an article on the development of bunt in the second volume of the Journal of the Horticultural Society of London, which seems entirely to have escaped notice on the Continent, where it is stated in a paper communicated by me on Jan. 18, 1847, with reference to the phenomena described, that " it is quite possible that in plants as well as in the lower animals there may be an alternation of generations." M. J. BERKELEY

NOTES

A RUMOUR is current that the Government have refused both ships and assistance to the Royal and Royal Astronomical Societies, which have been for some time organising expeditions to observe the approaching total eclipse of the sun. We can hardly believe that the Government will thus venture to brave the opinion of all men of science and culture. It would be a direct acknowledgment that the Government cares as little for a recent position for England in science and the arts of peace as it did a little time ago for her position in the arts of war. Verily we are a nation of Philistines !

OUR readers will hear with great regret that Prof. Wyville Thomson is prevented by illness from taking that share in the scientific exploration of the Mediterranean basin, now about to commence, which has conduced so greatly to the success of the previous expeditions in which he has been one of the workers.

M. OTTO STRUVE, director of the Observatory at Poulkova, M. Wild, director of the Physical Observatory at St. Petersburg, and M. Mohn, director of the Meteorological Institute of Christiania, have just arrived in Paris, for the purpose of taking part in the international conference charged with establishing a universal metre. In consequence, however, of the war, the meeting of the conference is postponed until such time as it may be summoned to meet by the Government.

AMONG the chances of war which have necessitated that Paris should be placed in a state of defence against a besieging enemy, the rasing of the Bois de Boulogne has become one of the first necessary operations. The fine collection of animals belonging to the Société Impériale d'Acclimatation will then have to share the fate of those belonging to the Zoological Society of Cologne, and be dispersed or removed till better times. It is even said that the axe is already at work.

THE Franco-German War is telling heavily on science on the Continent. In the number of the *Revue des Cours Scientifiques* for August 13th, the Editor hints at the possible suspension at an early date of the publication of his journal till the war is over.

To form an idea of the results of a general armament in Germany, it will be sufficient to learn that from the Berlin Chemical Laboratory, besides a great number of students, all the assistants, seven in number, have joined the army, partly as soldiers partly as field-apothecaries. When large masses of troops passed through Berlin, the director of the laboratory placed room for twenty soldiers at the disposal of the military authorities. University lectures have been prematurely closed. The military schools, the agricultural school, and the school of architecture had to close for want of pupils. The upper forms of the grammar schools have also sent many of their pupils into the field ; one of them as many as eighteen out of forty.

THE engineering] works of Messrs. Siemens and Halscke, and the ironfoundry of Borsig, are now almost exclusively occupied with the manufactory of torpedoes. It is said that great improvements have been made in these war-engines ; the point chiefly kept in view being to make them moveable from the shore by means of an electro-magnetical rotatory apparatus.

THE season for Congresses Scientific and other has now fairly set in. A Medical and an Engineering Congress are now sitting in the north ; we last week gave some of the arrangements for the forthcoming meeting of the British Association at Liverpool, and it is now announced that the Social Science Congress will meet from the 21st to the 28th of September, at Newcastle-on-Tyne, under the presidency of the Duke of Northumberland. The Social Science Congress has done what the British Association might also do to a certain extent with great advantage. It has stated the questions which press most for solution in the different branches of inquiry with which it deals. With two of these sections, namely, those of Education and Health, we are especially interested, and we willingly acknowledge the high importance of the questions which it is proposed to discuss. They are as follows :—Education. 1. Can better educational results in primary schools be obtained by the amalgamation of such schools? 2. By what means can a direct connection be established between the elementary and secondary schools and the Universities? 3. Is it desirable to teach science in elementary schools, and, if so, what branches of science? 1. Health. What is the best method of disposing of sewage and excreta? 2. What modifications are desirable in the existing sanitary laws and administration? 3. What legislative measures ought to be taken to prevent the adulteration of food, drink, and drugs?

The British Medical Association will meet next year at Plymouth, under the presidency of Mr. Whipple, consulting surgeon to the Plymouth Infirmary.

We have received the report of the Scottish Astronomer Royal to the Board of Visitors read at their visitation on the 29th of June. The report, in Mr. Piazzi Smyth's most curious style, refers to so many additional "facilitations" in the observatory that we may soon hope for some work to be done there, and to so many questions which have nothing to do with the observatory that we may possibly return to it.

At the London Institution, Finsbury Circus, on the 10th inst. Mr. J. P. Gassiot, D.C.L., F.R.S., distributed the prizes awarded, and certificates granted to students who have passed examinations on courses of Educational Lectures delivered during the past session. In the examination connected with Prof. Guthrie's course on Elementary Physics, Edmund Strode gained the first prize, while T. Lyon, Miss Esther Greatbatch, and Miss Annie Piper obtained prizes of the second order. In the examination on Professor Bloxam's chemical lectures, A. J. Richardson obtained the first prize, Isidore Harris and Miss E. M. Hutton taking second prizes. In the examination on Prof. Bentley's botanical course, Miss Emma Ball took the first prize; and A. J. Wallis and Miss Ellen Benham second prizes. Mr. Gassiot stated that the Educational Lectures of the London Institution were commenced in the spring of 1869, by Prof. Huxley, and that the attendance of students from the leading metropolitan schools had fully justified the belief of the managers that increased facilities for scientific education were needed. In distributing the prizes, which consisted of standard scientific books, handsomely bound, Mr. Gassiot referred to the early days of some of the eminent authors and discoverers who had been connected with the London Institution. He stated that arrangements for developing the educational powers of the institution were in progress, and delighted his audience by the announcement that Professors Odling and Huxley would deliver courses of lectures early in the coming session.

We have had from time to time to record evidences of the increased interest in science felt in the United States. We have just received the first number of the *American Scientific Monthly*, published at Iowa City, and edited by Prof. Gustavus Hinrichs. It contains articles of a popular rather than a deeply scientific character, on various branches of science, chemistry, geology, physics, physiology, &c.

The Sars subscription fund has now been closed, the total amount received being 12,283 francs.

M. Davaune states, in a recent number of *Cosmos*, that the proposal to raise a subscription on behalf of M. Niepce de St. Victor has met with a warm and hearty response.

Referring to the note in our issue of July 28, L'Abbé Moigno makes the following reply in *Les Mondes*:—"Le journal Nature a émaillé de points d'exclamations notre petit article sur les silex du Sinaï. Il s'étonne que nous nous soyons fait fort de prouver jusqu'à l'évidence que ces silex sont plus vieux que ceux des grottes d'Aurignac et autres. M. Louis Buchner, dont la Nature devrait bien reproduire les propres paroles, l'a dit avant nous. Il s'étonne plus encore de notre confiance dans le progrès, et rappelle de notre appel à M. Sorby:—attendons; le spectroscope jugera entre nous. En tout cas, c'est déjà quelque chose que des silex ou couteaux en pierre, vieux de 3,350 ans."

Mr. Ernest Hart has been unanimously elected Editor of the *British Medical Journal*, in the place of Mr. Jonathan Hutchinson.

The death is announced, at the age of 75, of Baron Charles von Hügel, one of the founders of the Horticultural Society at Vienna, and a collector, on a large scale, of new Australian plants. He was the author of several botanical works, and held the office of Austrian plenipotentiary at the court of Brussels.

It is hoped that the Cornell University will be able to form the nucleus of a museum, as Professor C. Fred. Hartt, with a professor of botany and nine students, intends exploring a portion of the valley of the Amazon and the Brazilian coast southward to Bahia, and to collect objects in natural history and geology. Professor Hartt proposes to take stereoscopic views of interest along his route.

The Royal Academy of Sciences of Belgium offers a prize of 800 francs for an essay on the Affinities of *Lycopodiaceæ*. The essays should be written in Latin, French, or Flemish, and forwarded to M. Ad. Quetelet, the secretary of the Academy, at Brussels, before June 1, 1871.

The practical examination of workmen and students for the Whitworth Scholarships has been fixed by Sir Joseph Whitworth to take place at his works at Manchester, on the 30th August and 1st September next.

The *Engineer* gives a plan and section of a proposed tunnel under the Bosphorus, planned by Mr. J. Haddan, one of the chief engineers to the Turkish Government. Unlike Messrs. Bateman and Révy's proposed Channel railway, the idea is to suspend the tunnel at about thirty-five feet below the surface of the water, and fix it to the bottom by means of holding chains.

Mr. George Fawcus, of North Shields, has contrived an equilateral triangular drawing-board for isometrical drawing. An ordinary T square applied on the edges of an equilateral triangle draws tangents that meet each other at angles of 120°, and other lines drawn parallel to these radiating ones form with them angles of 60° and 120°, which are the exact angles of the apparent squares of isometrical cubes. The inventor believes that the use of this new drawing-board will make the teaching of isometrical drawing both simple and easy. The practice of isometrical drawing is strongly urged in the science and art drawing classes.

A remedy has been found for the "borer" that ravages Indian and Ceylon coffee plantations, by applying carbolic acid before the eggs are hatched.

The curator of the Botanical Exchange Club has just issued his Report for the year 1869. Dr. Boswell-Syme takes the opportunity of recording all the observations which have come under his notice respecting new forms or varieties of British plants, or new localities of the rarer species.

Prof. Chandler, chemist to the Metropolitan Board of Health, New York, gives, in the *American Scientific Monthly*, his analysis of fifteen different kinds of fashionable hair-tonics, restoratives, &c., in all of which he finds lead varying in amount from one-ninth of a grain to sixteen grains in the ounce. He states that they owe their action to this metal, and are, consequently, highly dangerous to the health of persons using them. Lotions for the skin he found to be free from lead or other injurious metals, with the exception of one containing corrosive sublimate. The enamels examined consisted of either carbonate of lime, oxide of zinc, or carbonate of lead, suspended in water. The latter kind are highly dangerous; the two former are "as harmless as any other white dirt when plastered over the skin to close the pores and prevent its healthy action." The white powders for the skin are harmless to the same extent.

THE *Western Monthly* (Chicago), in its August number, has a very readable article on Sun Spots and their lessons, in which the author discusses the consequences of the obscuration of one part in one hundred and thirty of the sun's visible surface in the present year, and thinks that he is about to open one of the sealed volumes which contains the principles of prognostic meteorology.

THE "Proceedings of the Birmingham Natural History Society and Microscopical Society" for 1869, is another of those records of natural history researches in the provinces, of which we have so many gratifying instances, the more valuable when coming from the centre of a manufacturing district, where the thoughts of men are naturally turned in such very different channels. We have papers of various lengths on mineralogy, botany, microscopy, physiology, geology, entomology, malacology, and other branches of natural history, showing, if not much originality, much careful observant work. Appended are preliminary lists of the flowering plants, mosses, Lepidoptera, and Mollusca found within a radius of ten miles from Birmingham, a by no means inconsiderable array.

THE astronomical and meteorological observations of the National Observatory of Santiago, in Chile, have now been regularly published since 1853, chiefly by Don José Tomas Vergara. They also include the Valparaiso meteorological observations.

CINCHONA culture has now so far advanced in Madras that the Government is preparing to deal with it as an annual crop.

MR. WORTHINGTON SMITH records in the *Journal of Botany* an instance of a fatal case of poisoning by eating the root of the Water-dropwort, *Œnanthe crocata*, an umbelliferous plant common in ditches and wet places. A carter at Staplehurst, in Kent, ate some of the roots whilst at work, supposing them to be the wild parsnip; in about an hour he became unconscious and convulsed, and death occurred in another half-hour, before medical aid could be obtained. The man had fed his horse with roots of the same plant, and the animal also expired about two hours after eating them. There is no doubt that the *Œnanthe* is a virulent poison, but it seems strange that the horse, as well as the man, should not have rejected a plant of so acrid and suspicious a flavour. Several wild Umbelliferæ are among the most dangerous of British plants, and it is probable that the Greek poison κώνειον was obtained from others besides the hemlock.

SHARKS appear to have recently again made their appearance in the Gulf of Trieste, and the police have issued a notice forbidding people to bathe in the port or on the coast. For each fish destroyed in the waters between Punto Grona and the castle of Duino a reward of 300 florins (about 30*l.*) is given.

THE Indian Government has selected the Khond Hills for cinchona experiments. If they succeed the cultivation will be thrown open to private enterprise, with the view of further promoting employment and cultivation among the Khonds.

THE extent of the Wurdah coal-field in India has been confirmed, and the seams in Berar have been found to be 45 feet in total thickness.

THE total eclipse of July was observed at Constantinople by the Rev. C. Gribble, H.B.M. Chaplain, formerly of the Royal Navy, a local astronomical observer. He contributes an account to the *Levant Herald* of July 20. The dogs of Constantinople continued barking until about the middle of the eclipse.

WE have had occasion to refer to wild-beast legislation and administration, an important matter in India. A curious discussion has arisen in Bombay. Tigers having come to Salsette and killed several people, the magistrates applied to increase the reward, but the Government have refused, thinking that the report of the presence of tigers there will attract English sportsmen from Bombay.

"A CATALOGUE of Maps of the British Possessions in India and other parts of Asia," published by order of Her Majesty's Secretary of State for India in Council, is a very useful publication for those interested in our Asiatic possessions.

THE first and second quarterly publications for 1870 are issued of Auwers' and Winnecke's "Vierteljahrsschrift der Astronomischen Gesellschaft."

DR. SACHS'S "Lehrbuch der Botanik nach dem gegenwärtigen Stand der Wissenschaft" has reached a second enlarged and partly rewritten edition. It is illustrated with 453 woodcuts.

DR. KARL KARMARSCH'S "Technological Dictionary, English, French, German," of which the second edition is just issued, is a most useful compilation, containing the corresponding terms in these three languages employed in Architecture, civil, military, and naval; Civil Engineering, including bridge building, road and railway making; Mechanics, machine and engine making; Ship Building and Navigation; Metallurgy, mining and smelting; Artillery; Mathematics; Physics; Chemistry; Mineralogy; and generally in the Arts and Sciences.

DR. ENGELMANN publishes the first part of his "Results of Observations in the Leipzig Observatory," comprising those made with the meridian-circle.

M. VIDAL'S statement (says the *Photographic News*), that a sensitive plate, if exposed to light in the camera, and then placed behind the yellow glass window of a dark room, becomes attacked by the yellow rays and yields a fogged image, whereas a sensitive plate previously unexposed to light is not affected in the same manner, has been confirmed by results obtained in America, and detailed in the *Philadelphia Photographer*.

PAPERS ON IRON AND STEEL

I.—A VERY COSTLY AND VEXATIOUS FALLACY

I.

"A FRIEND of mine has been converting some common cinder pig-iron into either very fine iron or steel by a very simple process, but does not know who to apply to to learn its value. He is willing to share the profit with anyone who will help him in the matter. I have some small samples of it if you would like to see it, or can tell me who would be likely to interest themselves in the matter. From what I can make out I should think it would make good steel, for it will harden and temper now."

The above, quoted from a letter I have recently received, is a typical sample of a number of others I have had at different times, and it represents the labours of quite a multitude of patient, long-suffering, and miserably deluded investigators. The published specifications of abandoned patents make painful record of wasted money, time, and ingenuity; and suggest dark tragedies of ruined hopes, all arising from the same misunderstanding of the changes which take place in the conversion of *ordinary* pig-iron or cast-iron into *merchantable* steel.

The most humiliating feature of this delusion is that it is not the offspring of popular ignorance, is not prevalent among the beer-drinking class of iron-workers, who sign their names with a ×, but crops out among intelligent self-taught men, who have studied the chemistry of iron and steel as expounded in recognised chemical books. The costly fallacy I allude to is directly traceable to the teachings of our highest scientific authorities. As NATURE is now largely circulating among the class of self-taught and energetic men who supply this ever-recurring crop of victims, and also among those who most unwittingly and unwillingly have deceived them, there